

(19) World Intellectual Property Organization International Bureau



(43) International Publication Date  
26 May 2005 (26.05.2005)

PCT

(10) International Publication Number  
WO 2005/048191 A3

(51) International Patent Classification<sup>7</sup>: G06T 5/00 (74) Agent: LLOYD, Barry, George, William; BT Group Legal Intellectual Property Department, PPC5A, BT Centre, 81 Newgate Street, London, Greater London EC1A 7AJ (GB).

(21) International Application Number: PCT/GB2004/004685 (81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(22) International Filing Date: 8 November 2004 (08.11.2004) (84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

(25) Filing Language: English (26) Publication Language: English

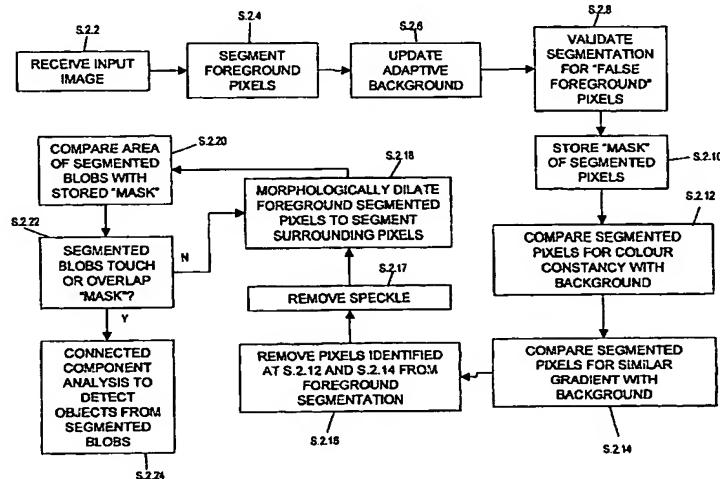
(30) Priority Data: 0326374.6 12 November 2003 (12.11.2003) GB

(71) Applicant (for all designated States except US): BRITISH TELECOMMUNICATIONS PUBLIC LIMITED COMPANY [GB/GB]; 81 Newgate Street, London, Greater London EC1A 7AJ (GB).

(72) Inventors; and (75) Inventors/Applicants (for US only): XU, Li-Qun [GB/GB]; 34 Dodson Vale, Kesgrave, Ipswich Suffolk IP5 2GT (GB). LANDABASO, Jose-Luis [ES/ES]; Campus Nord UPC, c/Jordi Girona 1-3, Edifici D5 - Despatx 218A, E-08035 Barcelona (ES).

[Continued on next page]

(54) Title: OBJECT DETECTION IN IMAGES



(57) Abstract: The invention applies a segmentation operation to an input image to identify foreground objects of interest, and then applies a shadow removal operation to remove any detected shadows from the foreground segmentation. The shadow removal algorithms can leave holes and bisects in the segmentation map, however, which will then subsequently impact on an object detection step performed using connected component analysis. To get around this problem, the invention applies a conditional morphological dilation operation to the segmentation map to "grow" the segmented blobs to fill in any holes and bisects, without re-growing shadow pixels in the segmentation. The result is an object detection method and system which is robust to illumination changes causing shadows and/or highlights.

WO 2005/048191 A3

**Published:**

- *with international search report*
- *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments*

*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

**(88) Date of publication of the international search report:**

7 July 2005